

## WHAT IS CLAIMED IS:

## 1. A process comprising the steps of:

5 (a) adding a substantially organic molten component with CSP value of at least 0.8 to a molten thermoplastic polymer and mixing to substantially uniformly disperse said molten component in said molten thermoplastic polymer and form a heterogeneous blend wherein

10 (i) the melt viscosity of said molten component is substantially less than the melt viscosity of said molten thermoplastic polymer; and

15 (ii) the amount of said molten component in said molten thermoplastic polymer is up to about ten percent by weight based on said heterogeneous blend; and

(b) melt processing said heterogeneous blend wherein said molten component preferentially locates near the surface of said molten thermoplastic polymer and substantially no chemical reaction occurs between said molten component and said molten thermoplastic polymer.

20 2. The process of claim 1 wherein rivet regions form between said molten component and said molten thermoplastic polymer thereby avoiding formation of a sheath/core structure with sharp interface.

25 3. The process of claim 1 wherein the ratio of the melt viscosity of said molten thermoplastic polymer to the melt viscosity of said molten component at the extrusion temperature is greater than about 10/1.

30 4. The process of claim 1 wherein said molten component is Formula (I) additive based on an end-capped polyamide or copolyamide of moderate molecular weight comprising one or more of the following units

(a)  $[-\text{NH}-(\text{CH}_2)_X-\text{C}(=\text{O})-]$  where  $x = 3-30$ ; or

(b)  $[-\text{NH}-\text{R}_1-\text{NH}-\text{C}(=\text{O})-\text{R}_2-\text{C}(=\text{O})-]$  where  $\text{R}_1$  and  $\text{R}_2$  are independently selected from

35 (i)  $-(\text{CH}_2)_Y-$  where  $Y = 3-30$ ; or

(ii)  $-\text{CH}_2-(\text{CH}_2-\text{O}-\text{CH}_2)_Z-\text{CH}_2-$  where  $Z = 1-30$ ; or

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(iii) for  $R_2$  only, hydrocarbon component in dimer acid comprising acyclic, monocyclic, bicyclic, and aromatic units and are partially or fully hydrogenated such that the resulting additive has a lower melting point than the molten thermoplastic polymer and the polyamide or copolyamide is

5 terminated to reduce the free carboxyl and amine end-groups wherein the terminating agents have functional groups capable of reacting with the free carboxyl or amine end-groups and consist of a substituted or unsubstituted aliphatic or aromatic having from one to 100 carbon atoms.

10 5. The process of claim 4 wherein the weight-average molecular weight of said Formula (I) additive is greater than about 1000 to less than about 25,000.

15 6. The process of claim 4 wherein the weight-average molecular weight of said Formula (I) additive is about 5,000 to about 15,000.

7. The process of claim 4 wherein said Formula (I) additive contains dimer acid.

20 8. The process of claim 1 wherein said molten component is Formula (II) additive derived from an end-capped polyolefin of moderate molecular weight and comprises any of the following units

25 (a)  $-[-\text{NH}-R_3-\text{NH}-]-$   
(b)  $-[-\text{C}(=\text{O})-\text{R}_4-\text{C}(=\text{O})-]-$

where  $R_3$  and/or  $R_4$  are polyolefin residues with degree of polymerization (dp) up to 250.

30 9. The process of claim 8 wherein the weight-average molecular weight of said Formula (II) additive is greater than about 1000 to less than about 25,000.

35 10. The process of claim 1 wherein said molten component is a polyolefin.

11. The process of claim 10 wherein the polyolefin is unsaturated.

12. The process of claim 10 wherein the polyolefin is polyethylene or a copolymer thereof.

13. The process of claim 1 wherein said thermoplastic polymer is  
5 polyester.

14. The process of claim 13 wherein said polyester is polyethylene terephthalate.

10 15. The process of claim 1 wherein said thermoplastic polymer is polyolefin.

15 16. The process of claim 1 wherein said thermoplastic polymer is polyamide.

15 17. The process of claim 16 wherein said thermoplastic polymer is polycaprolactam.

20 18. The process of claim 1 wherein said molten component contains an ultraviolet screen.

19. An additive of Formula (II) based on an end-capped polyamide or copolyamide of moderate molecular weight comprising one or more of the following units

25 (a)  $[-\text{NH}-(\text{CH}_2)_x-\text{C}(=\text{O})-]$  where  $x = 3-30$ ; or

(b)  $[-\text{NH}-\text{R}_1-\text{NH}-\text{C}(=\text{O})-\text{R}_2-\text{C}(=\text{O})-]$  where  $\text{R}_1$  and  $\text{R}_2$  are independently selected from

30 (i)  $-(\text{CH}_2)_Y-$  where  $Y = 3-30$ ; or

(ii)  $-\text{CH}_2-(\text{CH}_2-\text{O}-\text{CH}_2)_Z-\text{CH}_2-$  where  $Z = 1-30$ ; or

(iii) for  $\text{R}_2$  only, dimer acid hydrocarbon component

comprising acyclic, monocyclic, bicyclic, and aromatic units and are partially or fully hydrogenated such that the resulting additive has a lower melting point than the molten thermoplastic polymer

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and the polyamide or copolyamide is terminated to reduce the free carboxyl and amine end-groups wherein the terminating agents have functional groups capable of reacting with the free carboxyl or amine end-groups and consist of a substituted or unsubstituted aliphatic or aromatic having from 5 one to 100 carbon atoms.

20. The additive of claim 19 wherein the weight-average molecular weight of said Formula (I) additive is greater than about 1000 to less than about 25,000.

10 21. The additive of claim 19 wherein the weight-average molecular weight of said Formula (I) additive is about 5,000 to about 15,000.

15 22. The additive of claim 19 wherein said additive is a block copolymer.

23. The additive of claim 19 wherein said additive is a random copolymer.

20 24. The additive of claim 19 wherein each of said terminating agents has from one to 30 carbon atoms.

25 25. A flushing agent comprising the additive of claim 19.

26. A lubricating agent comprising the additive of claim 19.

27. A color concentrate comprising the additive of claim 19.

30 28. A heterogeneous blend comprising said additive of claim 19 and a thermoplastic polymer.

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29. The heterogeneous blend of claim 28 wherein said thermoplastic polymer is polyester.

30. The heterogeneous blend of claim 29 wherein said polyester is polyethylene terephthalate.

31. The heterogeneous blend of claim 29 wherein said polyester is polyethylene naphthalate.

32. The heterogeneous blend of claim 28 wherein the amount of said additive is up to about ten weight percent of said heterogeneous blend.

33. An article formed of the heterogeneous blend of claim 28.

34. The article of claim 33 wherein said article is film.

35. The article of claim 33 wherein said article is fiber.

36. The fiber of claim 35 wherein said additive is located near the surface of said thermoplastic polymer.

37. The article of claim 33 wherein said article is molded.

38. The fiber of claim 36 wherein the additive covers less than 90 percent of the surface of said thermoplastic polymer.

39. The fiber of claim 35 which additionally comprises an adhesive adhesion promoting additive.

40. The fiber of claim 39 wherein said adhesion promoting additive is a coating.

41. The fiber of claim 40 where the coating contains an epoxide and/or blocked isocyanate.

5 42. The fiber of claim 40 which additionally comprises a cross-linking adhesion promoting additive.

10 43. The fiber of claim 35 which additionally comprises a lubricating promoting additive.

44. The fiber of claim 35 which additionally comprises a color enhancing additive.

15 45. A composite comprising rubber and the fiber of claim 35.

46. A tire comprising the composite of claim 45.

47. A tire cap ply comprising the composite of claim 45.

48. A v-belt or conveyor belt comprising the composite of claim 45.

20 49. An additive of the Formula (II) derived from an end-capped polyolefin of moderate molecular weight and comprising any of the following units

(a)  $[-\text{NH}-\text{R}_3-\text{NH}-]$

(b)  $[-\text{C}(=\text{O})-\text{R}_4-\text{C}(=\text{O})-]$

25 where  $\text{R}_3$  and/or  $\text{R}_4$  are polyolefin residues with degree of polymerization (dp) up to 250.

30 50. The additive of claim 49 wherein the weight-average molecular weight of said Formula (II) additive is greater than about 1,000 to less than about 25,000.

51. A heterogeneous blend of said additive of claim 49 and a thermoplastic polymer.

52. The heterogeneous blend of claim 51 wherein said thermoplastic polymer is polyester.

53. The heterogeneous blend of claim 52 wherein said polyester is polyethylene terephthalate.

54. The heterogeneous blend of claim 52 wherein said polyester is polyethylene naphthalate.

10 55. An article formed of said heterogeneous blend of claim 51.

56. The article of claim 55 wherein said article is fiber.

15 57. A composite comprising rubber and the fiber of claim 56.

58. A tire comprising the composite of claim 57.

59. A tire cap ply comprising the composite of claim 57.

20 60. A v-belt or conveyor belt comprising the composite of claim 57.

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